IN THE EUROPEAN PATENT OFFICE

In The Matter of PCT International Patent Application:

Applicant	:	**Alberta Research Council Inc. et. al.**
PCT Appln. No.	:	**PCT/CA2003/001118**
PCT Filing Date	:	**24 July, 2003**
Title	:	**Metal-Supported Tubular Fuel Cell**
Our File	:	**V80029WO**
Date	:	**6 October, 2004**

European Patent Office (as International Preliminary Examining Authority)
Erhardstrasse 27
D-80331 Munich
GERMANY

BY FAX: 011-49-89-2399-4465

Reply To Written Opinion

In response to a Written Opinion by the International Preliminary Examining Authority dated 3 September 2004, Applicant provides a reply pursuant to PCT Rule 66.3:

Reply

In reply to matters raised in the Written Opinion:

First Invention (sections 2.1 to 2.2 of Written Opinion)

Applicant respectfully disagrees with the statement in 2.1 namely, that document D1 (WO A 0109968) anticipates in terms of novelty the subject matter of at least claims 1, 13, and 17 of the subject application.

Claims 1 to 23 of the subject application all claim a functional layer assembly supported by a support layer, and having a wall thickness less than or equal to 80 μm. Such a thin wall is achieved because mechanical support for the fuel cell is provided in part by the support layer.

There is no disclosure or suggestion anywhere in D1 of a functional layer assembly having these dimensions and structural arrangement.

Specifically, there is no disclosure in D1 of an electrolyte layer sandwiched by a pair of electrode layers (collectively, "functional layer assembly") that has a total thickness of 80 μm or less. There is some discussion in D1, especially at col. 12 line 32 – 39, of an "intermediate" layer between the electrolyte layer and the substrate that serves as a porous electrode layer. However, the thickness of this intermediate layer is not disclosed anywhere in D1. Furthermore, there is no discussion in D1 relating to selecting the properties of the substrate to serve as a support layer to enable the thickness of the functional layer assembly of the fuel cell to be reduced, i.e. D1 does not disclose any motivation to build a functional layer assembly with the dimensions claimed in the subject application.

Regarding the parts of D1 cited in the Search Report, the passage at page 11 lines 1-34 merely describe a tubular SOFC 200 coupled to interconnect 208; the interconnect 208 serves primarily to provide electrical conductivity. There is no disclosure or suggestion that the interconnect or another support member can be used to provide mechanical support to a functional layer assembly so that the thickness of the functional layer assembly can be reduced to 80 microns or less. Further, the passage at page 14 lines 15-22 merely discloses suitable substrate materials 302, and does not disclose the functional layer assembly dimensions as claimed in the subject application. Finally, the passage at page 19, lines 14-17 does not disclose the dimensions of the fuel cell shown in Figure 5D, nor suggest that a support layer can be used to provide mechanical support for a functional layer assembly having a wall thickness of 80 microns or less.

As D1 does not disclose or suggest the broad aspect of the invention claimed in independent claims 1, 13, 17 of the subject application, it follows that D1 does not disclose or suggest the narrower aspects of the invention as claimed in dependent claims of the independent claims.

Regarding D3 (PCT CA01/00634), this application fails to disclose the subject matter described in 2.2 of the Written Opinion, *as well as* a metallic porous support layer that has enough mechanical strength to provide support to a functional layer assembly, thereby enabling the functional layer assembly

wall thickness to be reduced to 80 microns or less. The passage cited in the Search Report, namely, page 16 lines 14-37 merely discloses a process of making a SOFC by depositing materials onto a combustible core. There is no disclosure or even suggestion of depositing fuel cell material onto a metallic support layer that is configured to provide sufficient mechanical strength to the functional layer assembly so that its wall thickness can be reduced to 80 microns or less.

Combining D2 (US 6,080,501) with D3 does not present the solution claimed in any of the claims of the subject application. D2 relates entirely to PEM type fuel cells, and not SOFC which are the subject of the claims of the subject application. Structural and functional arrangements of the two types of fuel cells are very different; a person skilled in the art of SOFC design would not readily look to PEM designs for SOFC specific solutions. Specifically, it would not occur to an SOFC designer to incorporate the porous central core 22 disclosed in page 2 lines 61-67 of D2, as such central core is made of DUOCEL foam, which would not survive under the much-higher operating temperatures found in SOFC applications. Even if it were obvious to make such a combination, nothing in D2 suggests that the central core 22 could be used to reduce the wall thickness of an SOFC functional layer assembly to 80 microns or less.

Second Invention (sections 2.3 of Written Opinion)

Applicant respectfully disagrees with 2.3 of the Written Opinion, and submits that claims 24-36 of the subject application are novel and possess inventive step in respect of D3. As noted above D3 merely discloses forming a tubular SOFC by depositing fuel cell material onto a combustible *conductive* fibre core made of carbon or graphite fibre tow (page 10 line 28-29). There is no disclosure or even suggestion of using a combustible *non-conductive* substrate member that is coated with a conductive substrate layer. By limiting the conductive portion of the substrate to an outer layer, and using an inexpensive combustible material as the substrate core, it is expected that the cost of manufacturing the fuel cell will be reduced. Sufficient conductive substrate material can be added so that it serves as mechanical support for

the electrodes and electrolyte of the fuel cell, thus enabling the wall thickness of electrodes and electrolyte to be reduced. Nothing in D3 discloses the challenge of reducing cost of the substrate, and thus there is no suggestion of the solution claimed in the subject application.

For the above reasons, Applicant submits all the claims possess novelty and an inventive step and looks forward to a favourable International Preliminary Examining Report.

Respectfully submitted,

GOWLING LAFLEUR HENDERSON LLP
1055 Dunsmuir Street, Suite 2300
Vancouver, British Columbia
Canada V7X 1J1

Per: Brian Lee
Agent for Applicant
Direct Dial (604) 443-7682
BL:dg
Encl.